

We claim:

1. A device for resuscitating a patient, the patient having a chest, intercostal muscles, and a diaphragm, said device comprising:

5 a chest compression device for repeatedly compressing and decompressing the chest of the patient;

10 an electro-stimulation system comprising a pair of ventilation electrodes, a pair of counterpulsion electrodes and an electrical generator, wherein the electrical generator generates a multiplicity of electrical signals and transmits the electrical signals to the pair of ventilation electrodes and the pair of counterpulsion electrodes; and

15 a controller for operating the chest compression device and the electro-stimulation system, wherein the controller operates the electro-stimulation system when the chest compression device is decompressing the chest;

20 wherein the controller operates the electrostimulation system to provide electrical signals to the ventilation electrodes and the counterpulsion electrodes when the chest compression device is decompressing the chest, and the electrical signals provided to the ventilation electrodes comprises a linearly ramped pulse train with an initial amplitude of about 10-50 milli-amps and a 25 final amplitude of about 100-200 milli-amps.

2. A device for resuscitating a patient, the patient having a chest, a heart, a diaphragm, intercostal muscles, and abdominal muscles, said device comprising:

a chest compression device for repeatedly compressing and decompressing the chest of the patient;

5 an electro-stimulation system comprising a plurality of electrodes and an electrical generator, the electrical generator being operable to generate a multiplicity of electrical signals and transmit the electrical signals to the plurality of electrodes; and

10 a controller for operating the chest compression device and the electro-stimulation system, said controller programmed to coordinate the operation of the chest compression device with the operation of the electro-stimulation system;

15 wherein the plurality of electrodes comprise a pair of ventilation electrodes, a pair of counterpulsion electrodes and a pair of defibrillation electrodes; and

20 wherein the pair of ventilation electrodes transmit at least one of the multiplicity of electrical signals from the electrical generator to stimulate respiration, wherein the pair of counterpulsion electrodes transmit at least one of the multiplicity of electrical signals from the electrical generator to stimulate the abdominal muscles, and wherein the pair of defibrillation electrodes transmit at least one of the multiplicity of electrical signals from the electrical generator to 25 defibrillate the heart;

wherein the controller operates the electrostimulation system to provide electrical signals to the ventilation electrodes and the counterpulsion electrodes when the chest compression device is decompressing the chest, and

the controller operates the electrostimulation system to provide electrical signals to the defibrillation electrodes at or near the end of compressions caused by the chest compression device.

5 3. A device for resuscitating a patient, the patient having a chest, a heart, a diaphragm, intercostal muscles, and abdominal muscles, said device comprising:

a chest compression device for repeatedly compressing and decompressing the chest of the patient;

10 an electro-stimulation system comprising a plurality of electrodes and an electrical generator, the electrical generator generates electrical signals and transmits the electrical signals to the plurality of electrodes; and

15 a controller for operating the chest compression device and the electro-stimulation system, said controller coordinates the operation of the chest compression device with the operation of the electro-stimulation system;

20 wherein the plurality of electrodes comprise a pair of ventilation electrodes, electrically connected to the generator, for transmitting the electrical signals to stimulate the diaphragm and intercostal muscles, a pair of counterpulsion electrodes, electrically connected to the generator, for transmitting the electrical signals to stimulate the abdominal muscles, a pair of defibrillation electrodes, electrically connected to the generator, for transmitting the electrical signals to defibrillate the heart;

25 wherein the controller operates the electrostimulation system to provide electrical signals to the ventilation

electrodes and the counterpulsion electrodes when the chest compression device is decompressing the chest, and the controller operates the electrostimulation system to provide electrical signals to the defibrillation 5 electrodes at or near the end of compressions caused by the chest compression device.

4. A device for resuscitating a patient, the patient having a chest, intercostal muscles, and a diaphragm, said device comprising:

10 a chest compression device for repeatedly compressing and decompressing the chest of the patient;

an electro-stimulation system comprising a pair of ventilation electrodes, a pair of counterpulsion electrodes and an electrical generator, wherein the 15 electrical generator generates a multiplicity of electrical signals and transmits the electrical signals to the pair of ventilation electrodes; and

20 a controller for operating the chest compression device and the electro-stimulation system, wherein the controller operates the electro-stimulation system when the chest compression device is decompressing the chest;

25 wherein the ventilation electrodes receive the electrical signals from the electrical generator and deliver the electrical signals to the diaphragm and the intercostal muscles to induce an inhalation.

5. The device of claim 4 wherein the controller operates the electrostimulation system to provide electrical signals to the ventilation electrodes and the counterpulsion electrodes when the chest compression device is decompressing the chest.